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Date deposited: 30th July 2014

Version of file: Author final



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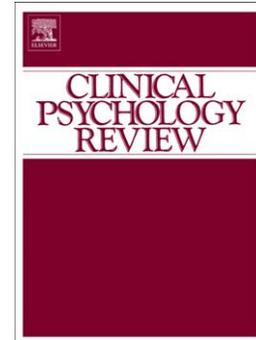
Emotion and internal experience in Obsessive Compulsive Disorder: Reviewing the role of Alexithymia, Anxiety Sensitivity and Distress Tolerance

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PII: S0272-7358(14)00052-X
DOI: doi: [10.1016/j.cpr.2014.03.003](https://doi.org/10.1016/j.cpr.2014.03.003)
Reference: CPR 1372

To appear in: *Clinical Psychology Review*

Received date: 1 November 2013
Revised date: 3 February 2014
Accepted date: 7 March 2014



Please cite this article as: Robinson, L.J. & Freeston, M.H., Emotion and internal experience in Obsessive Compulsive Disorder: Reviewing the role of Alexithymia, Anxiety Sensitivity and Distress Tolerance, *Clinical Psychology Review* (2014), doi: [10.1016/j.cpr.2014.03.003](https://doi.org/10.1016/j.cpr.2014.03.003)

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Title: Emotion and internal experience in Obsessive Compulsive Disorder: Reviewing the role of Alexithymia, Anxiety Sensitivity and Distress Tolerance

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Abstract

Increasing attention has focused on the role of emotion and internal experience in obsessive compulsive disorder (OCD). This review examines three key constructs that capture different aspects of understanding, appraisal and tolerance of internal states in OCD – alexithymia, anxiety sensitivity (AS) and distress tolerance (DT). The review examines the evidence for the role each of these constructs plays in OCD and considers whether conclusions can be drawn about the implications for our understanding and treatment of OCD. There is evidence that all three are elevated in clinical cases compared to controls, but there is no evidence that any of the three shows specificity for OCD over other anxiety disorders. However, the review has highlighted significant methodological heterogeneity and consequent variation in findings that currently limits broader conclusions from being drawn. There is an indication that this is a valuable area to explore and future studies should focus on deriving greater conceptual clarity around these constructs, independently replicating findings, and establishing a common methodology to enhance the comparability of studies. Studies exploring the ways in which internal experience, cognitions and symptoms may relate to one another would be of significant value in developing models that then lead to improved treatment approaches.

Keywords: Obsessive Compulsive Disorder, alexithymia, anxiety sensitivity, distress tolerance, experiential avoidance, emotion

Abstract word count: 200

Emotion and internal experience in Obsessive Compulsive Disorder: Reviewing the role of
Alexithymia, Anxiety Sensitivity and Distress Tolerance

Obsessive Compulsive Disorder (OCD) is a disorder where sufferers experience unwanted, intrusive thoughts, urges or mental images (obsessions) and/or perform repetitive, often ritualistic, behaviours that they feel they have to carry out (compulsions). It has an estimated lifetime prevalence of 0.6-3% (NICE, 2006; Stein, Forde, Anderson, & Walker, 1997) and in 1990 was listed as one of the top ten causes of disability worldwide (Murray & Lopez, 1996). Obsessions share a common feature in that they are distressing and the individual usually tries to resist them, however the content of obsessions varies widely among people with OCD. Common themes involve aggression, sexual thoughts, thoughts surrounding harm (to self or others) and contamination (from disease or social stigma). Compulsive behaviours are similarly diverse, for example involving washing, cleaning, checking, counting, or ordering. Some compulsions may be overt and observable (e.g. washing, touching certain objects in a certain order) whereas others may be covert and unobservable (e.g. set phrases of inner speech, bringing a specific image to mind). Until recently, OCD was classified as an anxiety disorder in diagnostic nomenclature. However, in recognition of the differences between OCD and other anxiety disorders, it has been separated in the fifth edition of the Diagnostic and Statistical Manual (DSM) (American Psychiatric Association, 2013) and appears as one of several disorders whose prominent features are obsessive preoccupation and repetitive behaviours.

Given the diversity of the behavioural phenotype, it has proven difficult to derive a psychological model of OCD that explains all the observed phenomenology. Psychodynamic accounts have suggested that obsessions and compulsions are defensive reactions that attempt to suppress deep unconscious conflicts involving strong primitive emotions, especially anger

(Gabbard, 2001; Moritz, Kempke, Luyten, Randjbar, & Jelinek, 2011). Psychodynamic models have rarely been adequately tested owing to the broadly idiographic approach and the lack of standardised measurement tools or alternative assessment methods for the constructs of interest. They also lack specificity for particular phenomena seen in OCD, with similar underlying conflicts implicated in disorders that manifest with a different behavioural expression. Consequently, there is an absence of robust evidence in support of this approach, although some individuals find treatment based on these principles beneficial (Chlebowski & Gregory, 2009).

The cognitive behavioural tradition has offered an alternative perspective, viewing obsessions and compulsions as stemming from cognitive biases surrounding the nature and meaning of thoughts, an elevated sense of responsibility for preventing harm, distorted beliefs about actions necessary and sufficient to prevent harm, and difficulty tolerating uncertainty (Salkovskis, 1999; Starcevic & Berle, 2006). Thought Action Fusion (TAF) – a belief that having a thought increases the likelihood of the thought content occurring or is the moral equivalent of the thought content occurring – seems to be a key distortion about the relationship between thoughts and action and has been shown to be elevated in people with OCD (Berle & Starcevic, 2005; Shafran, Thordarson, & Rachman, 1996). Together with elements of learning theory, these constructs form the basis of the cognitive behavioural understanding of OCD. The most common treatment – Exposure and Response Prevention (ERP) – is a behavioural approach that uses exposure to the anxiety-provoking stimulus and prevents the use of compulsions in order to foster habituation. Cognitive behavioural therapy (CBT) (often plus ERP) addresses cognitive distortions and biases. Both are effective treatments (Gava et al., 2009; NICE, 2006), however some patients find them intolerable or they only result in a partial reduction in symptoms (NICE, 2006). One review reported attrition rates from CBT or ERP treatment

ranging between 6-20%, with on average fewer than 30% of patients asymptomatic (by strict criteria) post-treatment and approximately one third experiencing no change in symptoms (Fisher & Wells, 2005). These figures suggest a gap in our understanding of the maintaining factors behind OCD symptoms and that improving our understanding of the psychological processes underlying obsessions and compulsions may enhance the efficacy of treatment.

In trying to understand the function of obsessions and compulsions, research has begun exploring the role of emotion and internal experience in OCD, with studies investigating emotional awareness, reaction to arousal symptoms and tolerance of distressing internal states. There are several factors that suggest exploring these may be worthwhile in this population, some specific to OCD and others to the experience of distress in general. Other disorders involving obsessions and repetitive behaviours have been linked with deficits in emotional awareness. For example, obsessions and repetitive behaviours are one of the distinguishing features of Autism Spectrum Disorders (ASDs) (Honey, Leekam, Turner, & McConachie, 2007; Zwaigenbaum, Bryson, & Garon, 2013), and ASDs have been consistently linked with deficits in identifying and expressing internal feeling states (Berthoz, Lalanne, Crane, & Hill, 2013; Hill, Berthoz, & Frith, 2004; Samson, Huber, & Gross, 2012). Some compulsive behaviours have parallels with addictive behaviours, whereby there is an urge to carry out the behaviour with escalating tension if the compulsion cannot be completed followed by relief once it is carried out. Poor distress tolerance has been linked with addictive behaviours (Brown, Lejuez, Kahler, & Strong, 2002; Stacey B. Daughters, Lejuez, Kahler, Strong, & Brown, 2005) and in parallel fashion the difficulty tolerating the distress associated with the trigger for the compulsion may be a contributory factor in the development of compulsive behaviour. Furthermore, evidence indicates that compulsive behaviours may serve to prevent anxiety levels increasing after

encountering a trigger (Haines, Josephs, Williams, & Wells, 1998), which suggests emotion-aversion may play a role in some symptom manifestations. Psychodynamic approaches have long-emphasised the emotion-avoidance function of OCD symptoms and ERP could be conceptualised as a form of interoceptive exposure that leads to greater emotion tolerance through habituation. However, the growth in the cognitive behavioural tradition has switched the emphasis to cognitive distortions. Cognitive judgements of arousal symptoms (such as difficulty concentrating when stressed being interpreted as indicating, “I am losing my mind”) may also be relevant in the phenomenology of OCD and increase the need to act to diminish arousal levels. These various reasons why emotions (or other unwanted internal experiences) may be aversive could contribute to the development and maintenance of OCD symptoms. Difficulty identifying and labelling emotions, such as is seen in alexithymia, could leave someone lost in a sea of confusing experiences having to develop concrete and comprehensible ways to cope (such as fixating on particular topics or repeating specific actions). Strong negative beliefs about the consequences of experiencing the bodily arousal associated with emotions, such as is captured by Anxiety Sensitivity (AS), may also increase the unpleasantness of even low-level arousal. A sense that emotions are overwhelming and unmanageable, as captured by constructs such as Distress (in)Tolerance (DT), could also increase the need for someone to develop strategies to avoid or quickly dissipate emotions. Controlling thoughts and compulsive behaviours may be some of the coping resources employed.

These measures of internal state aversion go beyond the concept of ‘harm avoidance’ – a temperamental construct reflecting excessive worrying, pessimism and ‘risk aversion’ – which has been shown to be elevated in people with OCD and their relatives (Ettelt et al., 2008; Richter, Summerfeldt, Joffe, & Swinson, 1996). Whereas harm avoidance refers to external

events, factors such as alexithymia, AS and DT refer to internal cues such as thoughts or bodily sensations that may be puzzling, unpleasant or distressing to endure.

Research is developing quickly in this area, and in order to develop a better understanding of the role these different constructs may play in OCD symptoms, it is helpful to review the growing literature. The taxonomy of constructs relating to emotion and internal experience is not well-established and there is a need for greater coherence – establishing what has been explored to date is important to develop firmer foundations for future research. Additionally, the different constructs have different implications for the possible function of OCD symptoms and their treatment – it is important to understand the relevant contributions of different factors in order to target treatment most effectively. The review begins by considering the constructs of Alexithymia, AS and DT.

Alexithymia

Alexithymia is a trait characteristic involving difficulty with emotional awareness. Those high in alexithymia have difficulty identifying and describing their own emotions and find it difficult to differentiate between emotions and body sensations (Aleman, 2005). It is a multidimensional construct that captures an individual's capacity to identify, discriminate between and verbally express the internal state associated with the felt experience of emotion. Literally meaning 'no words for emotions', people high in alexithymia have difficulties with understanding and expressing their feelings, as well as difficulty using representational or symbolic modes of mental functioning (G. J. Taylor, Bagby, & Parker, 1997). As such, they tend to have a literal understanding of language and situations and have a limited imagination or fantasy life. Both of these can cause functional impairment. Difficulties distinguishing the bodily changes associated with emotional reactions make it hard to use the signalling value of emotions

– termed ‘somatic markers’ by Damasio (1995) – in everyday life to identify patterns and inform decision-making. Life becomes unpredictable and the same difficulties may repeat themselves because, for example, emotional cues signalling danger, threat and fear are not readily distinguished. The restricted capacity for symbolic thought, imagination and fantasy can intensify distress, as all experiences are felt as if they are real (Carpenter & Chung, 2011). With regard to OCD specifically, for someone unable to distinguish between imagined mental events and reality, an intrusive thought would be equivalent to the event itself happening. This could heighten the distress associated with unpleasant thoughts and contribute to the sense that thoughts and reality are closely linked (thought action fusion).

The construct of alexithymia was initially developed from observations of patients with psychosomatic disorders (Sifneos, 1973). It was noted this patient group has marked difficulties understanding their own internal states and report a high degree of physical symptoms in absence of identified physical illness. Emotional states are associated with a plethora of physical changes in the body that, by an evolutionary account, prepare the organism for the course of action that is most likely to be needed next (Ekman & Friesen, 2003; Scherer, 2000). In the natural course of development, individuals can come to learn these patterns, understand their significance and develop regulatory strategies to modulate their internal state (Davidson, 2003). Symptoms of illness and anxious arousal often overlap (e.g. feeling hot and flushed, sweating, fast heart rate), but many people become able to differentiate the two by a process that is not yet understood. For some individuals it may be that this process is disrupted and normal fluctuations in bodily arousal that occur, for example, due to changes in emotional state are experienced as signs of physical illness (Bach, Bach, & Zwaan, 1996). Whilst the concept of alexithymia grew out of understanding the phenomenology of psychosomatic disorders, it has since been identified as

conferring vulnerability to psychological distress in general (G. J. Taylor, et al., 1997). Studies have shown higher levels of alexithymia in various psychiatric disorders (Bourke, Taylor, Parker, & Bagby, 1992; Cox, Swinson, Shulman, & Bourdeau, 1995; Haviland, Hendryx, Shaw, & Henry, 1994; G. J. Taylor, Parker, & Bagby, 1990; G. J. Taylor, Parker, Bagby, & Acklin, 1992; Zeitlin, McNally, & Cassiday, 1993).

Within OCD, the possible contribution of alexithymia to the clinical presentation has been considered. There is a question whether a restricted mental representation of emotional states results in the use of compulsive behaviours to enact internal dilemmas and serve to regulate affect (Carpenter & Chung, 2011). As discussed above, it has also been suggested that difficulty differentiating internal experiences, such as thoughts and images, from reality might make the experience of unwanted thoughts or images especially distressing. Additionally, rule-governed behaviours and a high-degree of social conformity can be characteristic of people with OCD, and these may both reflect high levels of concrete thought and restricted imagination.

The twenty-item Toronto Alexithymia Scale (TAS-20 (Bagby, Parker, & Taylor, 1994) is the most-widely used instrument to measure alexithymia and it has been translated into several languages. It has three subscales: 1) Difficulty identifying feelings and distinguishing them from bodily sensations (DIF), 2) Difficulty expressing feelings (DEF), and 3) Externally-oriented thinking (EOT). There is debate about the factor structure of the scale and whether the total scale score is or is not represented as a factor in a nested or hierarchical structure (Bagby, et al., 1994; Gignac, Palmer, & Stough, 2007). Initial analyses indicated three intercorrelated factors was a superior solution to a unidimensional structure (Bagby, et al., 1994), suggesting the subscales should be used when measuring this construct. Nonetheless, there is a total score cut-off of 61, with higher scores indicating clinically significant alexithymia. The construct of alexithymia has

remained relatively stable since its introduction and there has been little modification of the TAS over time.

Anxiety sensitivity

Anxiety sensitivity (AS) is conceptualized as a trait characteristic that reflects an individual's aversion to the experience of anxiety because of the belief that anxiety symptoms have harmful consequences (S. Taylor, 1995). Rather than stimuli becoming feared purely via associative learning, the concept of AS suggested that cognitive reactions to arousal states could in themselves generate fear because of the belief that the physical symptom of arousal could in itself be harmful. Those high in AS have negative beliefs about arousal symptoms and are likely to engage in strategies to avoid or rapidly dissipate anxious arousal to reduce the fear it causes. AS was first explored for its potential role in panic attacks in agoraphobia (S. Taylor, 1999), where catastrophic beliefs about the potentially fatal consequences of anxiety symptoms, such as breathlessness and rapid heartbeat, compound and maintain panic attacks (Beck, 1988). High AS is thought to heighten the anxiety response (since the trigger for the anxiety creates a physical response which is also feared) and thereby facilitate fear-conditioning (Olatunji & Wolitzky-Taylor, 2009). This enhanced conditionability suggests anxiety sensitivity may play a broader role in any disorder where anxiety is a key component. Indeed, elevated levels of AS have been shown in all anxiety disorders (except simple phobia) and OCD (S. Taylor, Koch, & McNally, 1992). AS is thought to nest within a hierarchical structure of vulnerability to anxiety and related disorders, with higher-order trait anxiety conferring susceptibility to respond fearfully at all, and AS a lower-order construct reflecting a tendency to respond fearfully to one's own anxiety sensations (Norton, Sexton, Walker, & Norton, 2005; Sexton, Norton, Walker, & Norton, 2003; S. Taylor, 1999).

The construct of AS was first developed by Reiss and McNally and first measured with the 16-item Anxiety Sensitivity Index (ASI) (Reiss, Peterson, Gursky, & McNally, 1986). Although initially posited as a unidimensional construct (S. Taylor, et al., 1992), factor analysis of the ASI suggested it has three sub-factors, best described as physical concern (fear of the physical symptoms of anxiety), cognitive concern (fear of cognitive dyscontrol), and social concern (fear of the negative social consequences of others noticing one's anxiety) (S. Taylor & Cox, 1998). Subsequent work has suggested the ASI has a hierarchical structure with one higher order factor (reflected by the total score) and three subfactors (Zinbarg, Barlow, & Brown, 1997). The general factor confers vulnerability to anxiety disorders, whereas the subfactors are believed to relate more specifically to particular anxiety disorder symptoms (physical concern to panic disorder and health anxiety; cognitive concern to obsessive compulsive disorder; social concern to social phobia) (Deacon & Abramowitz, 2006). The original ASI was criticised for its brevity (16 items) and the uneven number of items on the subscales (Olatunji & Wolitzky-Taylor, 2009). A subsequent revision, the ASI-R, had 36 items (S. Taylor & Cox, 1998), but further development work has resulted in the 18-item ASI-3 (S. Taylor et al., 2007), which in both clinical and non-clinical samples has shown the same hierarchical structure as its predecessors (Wheaton, Deacon, McGrath, Berman, & Abramowitz, 2012). The basic definition of AS has remained unchanged throughout the developments in its measurement, however the subscale structure has varied across scales.

The relationship between symptoms, syndromes and AS has largely been investigated in an exploratory fashion. Debate remains about the fundamental nature of AS and whether it represents a form of interoceptive conditioning, a cognitive distortion resulting from dysfunctional beliefs about the consequences of anxiety symptoms, or a 'true' sensitivity

representing a heightened ability to detect an internal stimulus. Understanding its relationship to anxiety symptoms at a theoretical level within the frameworks that exist for the different disorders is clouded by this ambiguity. As such, there is no specific rationale for a relationship between AS and OCD beyond the hypothesised link between sensitivity to anxiety symptoms and enhanced conditionability of fear. Given the importance of thought control for many individuals with OCD, it has been suggested that the AS dimension of fear of cognitive dyscontrol may be particularly pertinent in symptom expressions where thought-control is especially important (Wheaton, Mahaffey, Timpano, Berman, & Abramowitz, 2012).

Due to its hypothesised role in anxiety in general, research into AS has had a much broader context than simply its role within OCD. As such, studies which explore the construct and include either an OCD symptom measure or a client group with OCD have varied widely in their methods and emphasis.

Intolerance of Internal Experiences

AS has a narrow focus on anxiety, whereas concepts such as ‘experiential avoidance’ and ‘distress tolerance’ refer more generally to difficulties with any internal experience (including thoughts and other emotions). There is a family of constructs with face similarity that capture a sense of discomfort or catastrophizing about internal feelings which have developed out of different research or therapeutic traditions (Leyro, Zvolensky, & Bernstein, 2010). For example, third wave approaches have focused on changing an individual’s relationship to their internal experiences rather than ‘correcting’ their interpretations of the world (Twohig, Hayes, & Masuda, 2006). They use the concept of ‘experiential avoidance’ to refer to any internal experience an individual tries to stop or prevent happening. Research in impulse control disorders (such as addictions, self-harm and borderline personality disorder) uses the construct of

‘distress tolerance’ to refer to an individual’s limited capacity to experience unpleasant emotions because they are felt to be overwhelming, unmanageable or unacceptable (Timpano, Buckner, Richey, Murphy, & Schmidt, 2009). This results in a vicious cycle of using strategies that quickly relieve negative emotional states, but that is believed ultimately to reinforce the notion that the experience is to be avoided. Other similar overlapping constructs exist in the literature and there is no single unifying definition. As these constructs have been derived from the bottom-up phenomenology of emotional disorders rather than a top-down understanding of how internal experiences are generated, perceived and related to, they are not unified by a common understanding. They are not distinct from one another and variously capture different aspects of internal experiences, including cognitions about them, beliefs about their consequences, emotional reactions, behavioural reactions, and appraisals. To date the overlap in these constructs has not been explored empirically via methods such as factor analysis. In this review, the umbrella term ‘distress tolerance’ (DT) is used to describe this family of constructs.

It has been postulated that many of the symptoms of OCD centre around the avoidance of affect (McCubbin & Sampson, 2006). The Haines et al (1998) study mentioned previously reported evidence that obsessive-compulsive behaviours may serve to stop anxiety levels escalating. People with OCD were prevented from using their response behaviour/ritual and they showed significantly higher depersonalisation and there was a trend towards increased heart rate (Haines, et al., 1998). The themes of many obsessive thoughts are related to strong emotions such as aggression, anger, lust, and disgust. As patients go to extreme lengths to block these thoughts, this may reflect a fundamental intolerance of these emotions. Additionally the urgency to act to neutralise or counter the threat from a triggering stimulus shares parallels with the urgency of other impulse control disorders, where it has been shown that difficulty tolerating

emotional states contributes to the urgent need to act to avoid emotions (Anestis, Selby, Fink, & Joiner, 2007; Buckner, Keough, & Schmidt, 2007; S. B. Daughters et al., 2005; Nock & Mendes, 2008).

It is uncontroversial to any major therapeutic tradition to postulate that individuals with anxiety disorders or OCD have at least some difficulty managing emotions, however the development and measurement of formalised constructs to measure DT is relatively recent. A number have been used, although they vary in the degree of development and validation (e.g. Perceptions of Threat from Emotions Questionnaire (McCubbin & Sampson, 2006), Distress Tolerance Scale (Simons & Gaher, 2005), the Acceptance and Action Questionnaire (Hayes et al., 2004), Difficulties with Emotion Regulation Scale (Gratz & Roemer, 2004), Affective Control Scale (Williams, Chambless, & Ahrens, 1997). The 15-item Distress Tolerance Scale (Simons & Gaher, 2005) is the first scale specifically developed to measure DT as explored in emotional and impulse control disorders, but its psychometric properties – especially in anxiety disorders or OCD – have not been thoroughly explored.

Summary and aim

This review aims to synthesise the evidence for the role each of these constructs plays in OCD and to identify whether the state of the present evidence enables conclusions to be drawn about the implications for our understanding and treatment of OCD. There are four main types of findings to consider. First, whether analogue studies have shown evidence of a relationship between these constructs and levels of OCD symptoms. Second, whether these constructs explain variance in symptoms above and beyond established constructs. Third, whether clinical studies have indicated elevated levels of alexithymia, anxiety sensitivity and distress intolerance in

people with OCD, and finally whether within OCD samples these constructs show consistent relationships with particular symptoms or clinical features.

Methods

Search Methodology

Databases

Medline (all years), Embase (1980-present), PsychInfo (1967-present) were searched on 12/03/12, and Web of Knowledge (1970-present) and Scopus (1970-present) were searched on 25/9/12 and 4/10/13 (Medline was also re-searched on these dates). Date limits were set from available alternatives to cover 1980 onwards, which marks the publication of the third edition of the Diagnostic & Statistics Manual for Mental Disorders (DSM-III) and the increased use of standardised diagnostic interviews or questionnaire measures for sample characterisation. This date was chosen to enhance the comparability of studies over time. No other limits were used.

Search Terms

All search terms were entered as keywords and were not mapped to subject headings. The search terms comprised ('Obsessive compulsive disorder' AND ('anxiety sensitivity' OR 'fear of fear' OR 'fear of emotion' OR 'emotion\$ avoidance')). Reading the titles of the articles retrieved via this search identified alternative search terms for emotion appraisal which were each combined with 'Obsessive compulsive disorder' using the 'AND' term in a series of sequential searches. The alternative emotion appraisal terms comprised: 'body vigilance', 'distress tolerance', 'fear of anxiety', 'interoceptive conditioning', 'catastrophic associations', 'emotion\$ \$regulation', and 'alexithymia'.

Search Results

The searches identified 746 articles. Titles (and abstracts where necessary) were read and 210 records were exported to Endnote X5 bibliographic software and duplicates were removed. All abstracts were read and studies with an OCD, mixed anxiety disorders or analogue sample that explored anxiety sensitivity, alexithymia, or distress tolerance were selected for further review (n=69).

Inclusion/Exclusion Criteria

Full texts were retrieved and screened for suitability. Conference abstracts, non-English language articles and dissertations were excluded.

Reference lists of articles meeting inclusion criteria were searched for further relevant articles; nine were identified. These studies were missed from the initial search owing to differences in terminology used.

For the purposes of this review the following were classed as relevant measures of the constructs of interest: Alexithymia – Toronto Alexithymia Scale; AS – any version of the ASI; DT – the Acceptance and Action Questionnaire (AAQ) (Hayes, et al., 2004), Perception of Threat from Emotion Questionnaire (PTEQ) (McCubbin & Sampson, 2006), the Distress Tolerance Scale (DTS) (Simons & Gaher, 2005). Studies capturing only broader related constructs such as emotional intelligence or emotion regulation were not included (e.g. Trait Meta-Mood Scale (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995), Affective Control Scale (Williams, et al., 1997), Difficulties with Emotion Regulation Scale (Gratz & Roemer, 2004)).

Studies were included if they measured any of the three constructs of interest and included either an analogue sample where OCD symptoms were measured or an OCD sample. Results of the OCD group or findings pertaining to the OCD measure had to be reported

separately (i.e. studies were not included where OCD symptoms were simply covaried). Studies that focused specifically on hoarding were not included, as there is growing evidence that hoarding disorder merits consideration as an independent disorder to OCD (Mataix-Cols et al., 2010) as DSM-5 has now proposed. Some of the studies measured more than one of the constructs of interest. If the findings for the different constructs were reported independently, the study was evaluated in all relevant sections. If one construct was the focus of the study and the other used as a covariate or as an established construct in the field to demonstrate incremental predictive utility, the study was only evaluated within the section relevant to the measure that was the focus of the study.

Results

Methodological issues

There are a number of issues within the field as a whole that it is helpful to consider before proceeding to the review. They are highlighted here rather than alongside each individual study.

Conceptual clarity

One of the key issues is a lack of conceptual clarity around the key constructs. This is difficult for individual studies to address until sufficient work has clarified the taxonomy of these constructs and their interrelationships. The most common strategy authors have used is hierarchical multiple regression to control for variance explained by similar measures. However, very few report addressing multi-collinearity and its potential impact.

Measurement

The scales used vary in their adequacy in terms of psychometric properties and their construct validity. Relatively newer scales like the DTS and AAQ do not have well-established properties in anxiety disorder or OCD populations. Development of the ASI in particular has resulted in multiple versions, which have varied in their subscales. Some studies explored the factor solution for the ASI within their sample and derived their own subscales before performing subsequent analyses (Calamari, Rector, Woodard, Cohen, & Chik, 2008; Deacon & Abramowitz, 2006; Zinbarg, et al., 1997). The factor congruence between studies has varied, but has at least been explored (Deacon & Abramowitz, 2006; Zinbarg, et al., 1997). This creates an added difficulty with comparing studies over time. There has also been limited reporting of subgroup mean scores in studies involving multiple/mixed patient groups and subscale scores on measures such as the TAS-20 and the ASI. Given these scales are both accepted to have a multi-factorial structure, relationships with total scale score only are difficult to interpret.

Sampling Issues

Studies have been conducted on a variety of different sample types including non-clinical student populations, general population studies, mixed clinical samples, OCD-only samples with a variety of rigour in the diagnostic procedure, and self-identified OCD participants. The study sample markedly impacts the generalisability and ecological validity of the findings, although each type of study adds some information to the core clinical questions and this diversity helps to build a more complete picture. Generally the associational studies in student samples have had large sample sizes to provide reasonable power, however studies in clinical populations have tended to involve smaller groups which may impact on power to detect significant relationships or (sub)group differences.

Heterogeneity of OCD

One of the key difficulties facing OCD research is the heterogeneity of the disorder itself. Behaviour-based categorical diagnostic systems, such as the DSM, classify disorders by observed symptoms on the assumption that the behaviours show functional equivalence both within and between people. Taking compulsive behaviours alone, not only are several disparate behaviours treated as effectively equivalent (e.g. washing, checking, cleaning, tidying, ordering, collecting), but it is also assumed that all instances of the same behaviour are performed for the same underlying reason. It is known that this is not the case; for example someone may check to ensure something is free of contaminants or to ensure they have not caused harm (Abramowitz et al., 2010; Wheaton, Abramowitz, Berman, Riemann, & Hale, 2010).

Attempts have been made to classify OCD into subtypes based on the behavioural profile (Calamari et al., 2004). This method tends to result in the identification of 5-7 main subtypes and it has the advantage of using something relatively observable (and therefore measurable). However it suffers from the same functional equivalence limitation – it groups people by *what* they do, rather than *why* they do it. Given that interventions based on psychological formulation explore the functional significance of an action for a person in order to understand how best to effect change, the underlying reasons behind a behaviour are of greater importance by this account. Several ‘dysfunctional’ beliefs have been identified as potentially playing an important role in some OCD presentations and attempts have been made to classify subtypes based on the constellation of underlying beliefs rather than symptoms (Abramowitz, et al., 2010). This raises measurement issues, as beliefs are not directly observable and individuals vary in the degree of insight they have into their internal belief structure.

As the research agenda gathers pace, it could be that more satisfactory ways of differentiating relevant distinctions between OCD presentations emerge. However, until this time, analyses involving total scale scores on OCD symptom measures are likely to incorporate significant variation in the phenomenology of the disorder based on differential sampling of subgroups and therefore show relatively weak relationships with constructs that are more specific to particular functional manifestations of symptoms. Therefore variance explained may be relatively low and findings between studies may vary greatly due to differences in the expression of symptoms across samples. Most studies continue to use total scale scores, diagnosis or broadly grouped categories ('obsessions', 'compulsions'), although some have differentiated between different OCD presentations based on symptom subscale scores (Abramowitz, Lackey, & Wheaton, 2009; Carpenter & Chung, 2011; Cogle, Timpano, Fitch, & Hawkins, 2011; Cogle, Timpano, & Goetz, 2012; David et al., 2009; Kang, Namkoong, Yoo, Jung, & Kim, 2012), symptom dimensions (Calamari, et al., 2008; Calamari, et al., 2004; Roh, Kim, & Kim, 2011), or belief-based dimensions (Wheaton, Mahaffey, et al., 2012).

Review

Alexithymia

The search identified nine studies of alexithymia in patients with OCD (Table 1). Where available, mean reported scores on the TAS are reported in Table 2 for the OCD sample and the healthy control group or comparison patient group.

-- Table 1 --

-- Table 2 --

OCD versus non-clinical controls

Five studies included a non-clinical control group (Besharat, 2008; Carpenter & Chung, 2011; Grabe et al., 2006; Kang, et al., 2012; Roh, et al., 2011). Four of the studies reported significantly higher scores for the OCD patients on all three subscales of the TAS (Besharat, 2008; Carpenter & Chung, 2011; Grabe, et al., 2006; Roh, et al., 2011), although in the Grabe, et al. (2006) study differences on the EOT subscale were not statistically significant. In the remaining study, Kang, et al. (2012) reported that 41% of the clinical group scored in the alexithymic range compared to only 4% of the control group.

This indicates that people with OCD have elevated levels of alexithymia compared to people without an anxiety disorder and that this is the case for all three factors. Examining the effect sizes of the differences (Cohen's d) for the four studies reporting means and standard deviations shows medium to large effect sizes on factors 1 and 2 and small to medium on factor 3 (range: factor 1 $d=0.60-1.09$, factor 2 $d=0.37-0.92$, factor 3 $d=0.20-0.64$). Carpenter and Chung (2011) reported notably larger effect sizes than the other studies, which reported only small to medium effects. These authors conducted their study online and sampled online self-help groups rather than participants identified from clinics. It is possible that this captured a broader range of severity, as face to face studies involving screened participants accessing treatment may filter out individuals with a more severe disorder and certainly represents only a subsample of those meeting criteria for a diagnosis.

OCD and clinical comparison groups

Three studies compared scores on the TAS across patient groups (Bankier, Aigner, & Bach, 2001; Besharat, 2008; Zeitlin & McNally, 1993). Zeitlin and McNally (1993) contrasted patients with panic disorder with those with OCD and reported that panic disorder patients

scored significantly higher on total TAS. A higher proportion of panic disorder patients (67%) scored in the alexithymic range than OCD patients (13%). Bankier, et al. (2001) included patients with somatoform disorder, depression and panic disorder. In contrast to Zeitlin and McNally (1993), they reported the panic disorder group scored significantly below the other groups. Although OCD was not the focus of this study, the authors also reported a significant association between an OCD diagnosis and higher scores on the EOT subscale of the TAS. Besharat (2008) included patients with ‘anxiety’ and depression and reported no significant differences between patients with OCD and either of the other clinical groups.

The small number of studies makes it difficult to draw conclusions, especially with the variation in findings, although from these studies there is no evidence that elevated levels of alexithymia are specific to OCD. The variation between studies may be due to different types of sample (e.g. Bankier, et al. (2001) used inpatients) and using different versions of the TAS. Only Besharat (2008) compared groups on subscales of the TAS; the others compared groups on total score.

OCD-Only studies

Three studies have explored alexithymia within an OCD sample – two examined changes in alexithymia with treatment (Rufer et al., 2004; Rufer et al., 2006) and one looked at the relationship between insight and alexithymia (De Berardis et al., 2005). The two treatment studies involved the same sample, with the latter reporting an extended follow-up interval. They measured alexithymia before and after CBT treatment and indicated relative stability of TAS scores over time with strong significant correlations between TAS scores across time points. Scores on DIF and DEF dropped over time, but there was no significant change in EOT scores. Rufer, et al. (2004) divided the sample into those scoring in the alexithymic range and those

below the cut-off and reported no significant differences in treatment outcome in terms of symptom change. Similarly, Rufer, et al. (2006) reported no significant relationship between any of the TAS dimensions post-treatment and OCD symptoms at follow-up. These studies concluded there is no evidence to indicate alexithymia has an adverse effect on treatment outcome.

The study exploring the relationship between insight and alexithymia used regression analysis to identify significant predictors of insight. Both depression and EOT from the TAS were significantly associated with level of insight (with greater EOT associated with poorer insight).

One of the studies mentioned in the previous section (Roh, et al., 2011) explored the relationship between OCD symptom dimensions derived from a behaviour-based measure and alexithymia within their OCD sample. Using regression analysis, they reported the only symptom dimension that emerged as a statistically significant predictor of total TAS score was the sexual/religious dimension. The other four symptom dimensions in this study (symmetry/ordering, hoarding, contamination/cleaning, and aggressive/checking) did not show a significant relationship with total TAS score.

Overall Summary

The studies of alexithymia in OCD indicate it is elevated in OCD compared to non-clinical groups, but that it is not higher in patients with OCD compared to other clinical groups. One study that explored the impact of alexithymia on treatment response did not report poorer treatment response was associated with higher levels of alexithymia. Scores on EOT were significantly associated with an OCD diagnosis and showed no change with treatment. This aspect of alexithymia may be more implicated in OCD, although additionally this may reflect

criterion confound, as the description of EOT mirrors some of the symptoms of OCD that are asked about in standard diagnostic interviews and questionnaires. Developing a better understanding of the relationship between alexithymia and OCD has been hampered by studies using total TAS score and total scores on OCD symptoms measures (or using diagnosis as a binary variable).

Anxiety Sensitivity

The search identified 14 studies exploring anxiety sensitivity and the relationship with OCD (full-syndrome, symptoms or symptom-dimensions) in clinical or non-clinical samples (Table 3; very few studies reported mean scores on the AS measures therefore a table of scores is not provided).

-- Table 3 --

Non-clinical studies

Four studies explored AS using non-clinical student samples. The main focus of these studies varied and only the findings relating to OCD and AS are discussed here.

Two studies explored total OCD symptoms. In a relatively small sample of 91 undergraduates, Sexton, et al. (2003) reported a significant relationship between scores on the ASI-R and level of OCD symptoms using regression-based path analysis. This relationship had not been hypothesized, but this model explained a greater proportion of variance in OCD symptoms (17.2%) than the hypothesised model (14%) in which only Neuroticism scores were entered as a predictor. It is worth commenting that the strength of the relationship between OCD symptoms and ASI-R (standardised path coefficient = 0.33) was similar to that between panic disorder symptoms and ASI-R (0.30), but lower than that between health anxiety symptoms and

ASI-R (0.46) (it must be noted these differences between path coefficients may not be statistically significant). However, overall the proportion of variance explained in OCD symptoms by the full model was notably less than that explained in each of the other three symptom-sets considered (panic, health anxiety and GAD).

Keough, Riccardi, Timpano, Mitchell, and Schmidt (2010) reported a significant correlation between ASI total score OCI-R total score ($r=0.51$) in a large student sample. In regression analyses, ASI remained a significant predictor of total OCI-R score even after other factors had been accounted for.

Two studies explored OCD symptom dimensions. David, et al. (2009) reported that ASI-3 total score was significantly correlated with scores on each of 6 OCD symptom dimensions measured by the OCI-R in a sample of 270 undergraduates. Correlation coefficients ranged from $r=0.37$ (neutralising) to $r=0.56$ (obsessions). In a second sample ($n=300$) symptom measures were administered at two time points 12 weeks apart. The correlations between ASI-3 at time 1 and OCD symptom dimensions at time 2 were all statistically significant and ranged from $r=0.3$ (ordering) to $r=0.52$ (obsessions). Interestingly, the correlations between time 1 OCD symptoms and time 2 ASI-3 scores were stronger ranging from $r=0.40$ (ordering) to $r=0.62$ (obsessions), suggesting the direction of causation has to be carefully considered. In a regression analysis predicting time 2 OCD symptoms from the time 1 measures, the joint combination of ASI-3 and negative affectivity (measured with the PANAS) significantly predicted obsessions, hoarding, checking and neutralising (ΔR^2 range 1.4%-3%). The independent contribution of ASI-3 alone was not reported.

Wheaton, Mahaffey, et al. (2012) explored the relationship between scores on a dimensional measure of OCD symptoms (DOCS) and scores on the subscales of the ASI-3. All

four symptom dimensions (contamination, responsibility, thoughts, symmetry) correlated moderately ($r=0.28-0.44$) and significantly with all ASI-3 subscales. Within each symptom dimension, the authors statistically compared the strength of the correlations with each subscale to explore whether particular symptom profiles are associated with specific facets of AS. Both the contamination and responsibility dimensions were significantly more strongly correlated with physical and cognitive concerns than social concerns. The unwanted thoughts dimension was significantly more strongly related to cognitive concerns than both physical and social concerns. The symmetry dimension showed no significant differences in the strength of the correlations with each subscale and showed the weakest relationships with ASI-3 scores. In subsequent regression analyses with symptom dimensions as the dependent variables, some of the ASI-3 subscales explained a statistically significant proportion of additional variance once depression and OCD-relevant beliefs were accounted for. Different subscales predicted different symptom dimensions, suggesting there is value in exploring them separately.

OCD versus non-clinical controls

Three studies included a mixed patient sample alongside a non-clinical comparison group. In all studies patients with OCD scored significantly higher than the non-clinical groups on all ASI measures examined (Deacon & Abramowitz, 2006; Wheaton, Deacon, et al., 2012; Zinbarg, et al., 1997). These studies also examined ASI scores and their variation across anxiety disorder and OCD groups or relationship with different anxiety symptom measures within the clinical sample alone (Deacon & Abramowitz, 2006; Wheaton, Deacon, et al., 2012). These are discussed below.

OCD and clinical comparison group

Five further studies and three already discussed above included analyses that explored AS in a mixed sample of patients with anxiety disorders.

Correlational findings

Two reported no significant relationship between scores on OCD measures (as rated by all patients, not just patients with OCD) and ASI (McWilliams, Becker, Margraf, Clara, & Vriends, 2007; Norton, et al., 2005). The two studies mentioned above that also contained a non-clinical control sample both reported significant relationships between total OCD symptoms and ASI scores in their clinical samples, but the relationships between ASI and other anxiety symptoms (e.g. health anxiety, panic, social phobia and worry) were generally stronger than those between ASI and OCD symptoms (although the statistical significance of differences in the correlation coefficients was not assessed) (Deacon & Abramowitz, 2008; Wheaton, Deacon, et al., 2012). This implies that there is a relationship with OCD symptoms, but it is weaker than that seen in other disorders. Although it should be noted that these analyses included ratings on OCD measures by individuals with diagnoses other than OCD, and in one sample there were only 11 people with an OCD diagnosis (Deacon & Abramowitz, 2006). This raises the question whether this relationship has been adequately explored.

Group comparisons

Three studies divided the clinical group into diagnostic groups and compared scores on the ASI using ANOVA (Deacon & Abramowitz, 2008; G. J. Taylor, et al., 1992; Zeitlin & McNally, 1993). In these studies patients with OCD did not score significantly higher than other

patients with anxiety disorders on the ASI or its subscales. Zeitlin & McNally (1993) reported the OCD group scored significantly lower than panic disorder patients on total ASI score.

Three of the studies discussed above that also included a non-clinical comparison group compared OCD patients with anxiety disorder groups and reported a varied pattern of findings. One study reported OCD patients scored significantly higher than patients with social phobia and specific phobia (Zinbarg, et al., 1997). Another also reported significantly higher ASI scores in the OCD group than the social phobia group, but only on one subscale (the respiratory subscale; the authors of this study derived their own ASI factors based on the scores in their sample) (Deacon & Abramowitz, 2006). In this study the OCD group scored significantly higher on the physical subscale than all other patient groups except panic. The third study reported patients with OCD scored significantly lower than patients with panic on total ASI score, significantly lower than patients with panic or hypochondriasis on the physical subscale, and showed no significant differences with any of the groups on the social or cognitive concerns subscales (Wheaton, Deacon, et al., 2012).

OCD-Only Studies

Two closely-related studies explored the relationship between OCD symptom dimensions and ASI scores. Calamari, et al. (2004) reported a significant omnibus difference between 7 symptom-based OCD subgroups on total ASI score (version not reported), however there were no statistically significant between-group differences on post-hoc follow-up. This suggests different subgroups do have different levels of AS, however perhaps the power of the study was insufficient to detect group differences.

Calamari, et al. (2008) reported moderate and significant correlations between overall OCD symptoms (Y-BOCS) and all ASI subscales (range $r=0.28-0.32$; ASI version not clear).

They divided the OCD sample into seven subgroups and compared mean scores on the ASI total score and subscale scores. The pattern of findings is difficult to summarise, but one key finding is that the contamination/harming subgroup ($n=56$) report the highest mean scores across all ASI dimensions and the hoarding group ($n=12$) the lowest. The authors correlated overall OCD symptom severity for each subgroup with each of the ASI dimensions, controlling for depression. The contamination, harming, hoarding, obsessional and symmetry subgroups did not show a significant relationship between symptom severity and any ASI score. The contamination/harming subgroup showed a significant relationship (partial $r=0.28$) with the cognitive concerns subscale. The certainty subgroup showed strong significant relationships between symptom severity and total ASI score (partial $r=0.64$), physical concerns subscale score (partial $r=0.58$) and social concerns subscale score (partial $r=0.60$).

Overall Summary

The findings somewhat mirror those for alexithymia in that there is evidence that AS is elevated in people with OCD compared with non-clinical controls, but it is not generally higher than the level seen in anxiety disorders. It is generally lower than the level seen in panic disorder, although this may reflect the fact AS was a construct derived from the phenomenology of panic disorder and the measurement instruments may exhibit greater specificity (or criterion confound) for the relevant feared anxiety sensations in this population. The non-clinical studies and OCD-only studies addressed the relationship between OCD symptoms and facets of AS. Findings have varied and there is no obvious pattern, although all reported at least one significant relationship between an OCD symptom measure/subscale and one AS score. There was some evidence that AS adds explanatory power to OCD symptoms over and above established predictors of symptoms (depression and OCD-relevant beliefs). However, there was also a suggestion that the

relationship between AS and OCD symptoms is weaker than the relationship reported in anxiety disorders. This may indicate AS plays a lesser role in OCD than other disorders, or alternatively it may reflect the difficulty in measuring OCD sensitively across subtypes and unconfounding breadth and severity of symptoms which results in a high degree of variance in global symptom score measures.

There was some evidence for the theorised relationship between the cognitive dyscontrol subscale and obsessive symptoms. In non-clinical samples, obsessions were more strongly correlated with total ASI than were other symptom domains (David, et al., 2009) and high scores on the unwanted thoughts dimension correlated significantly positively with the cognitive concerns subscale but not the other ASI subscales (Wheaton, Mahaffey, et al., 2012). However, in a single clinical sample no relationship was reported between obsessions and fear of cognitive dyscontrol (Calamari, et al., 2008).

Distress Tolerance

The search identified 11 studies exploring distress tolerance and its relationship to OCD (Table 4; very few studies reported mean scores on the DT measures therefore a table of scores is not provided).

-- Table 4 --

Non clinical studies

Seven studies were conducted within non-clinical samples. All used a student sample except one, where the majority of participants were drawn from the general community (Briggs & Price, 2009). Four studies used the DTS, one used the Perception of Threat from Emotion Questionnaire (PTEQ) (McCubbin & Sampson, 2006) and two used variants of the Acceptance

and Action Questionnaire (AAQ) (Hayes, et al., 2004). For the present review these are treated as capturing a broad sense of threat from or discomfort with emotion, which for ease will be referred to as distress tolerance (DT), but it should be noted that these scales also cover broader constructs such as Experiential Avoidance and Interoceptive Sensitivity.

All of the studies reported some degree of relationship (generally weak to moderate) between DT and OCD symptoms. One study reported that DT did not show incremental predictive utility for OCD symptoms when it was entered into analyses after established OCD-relevant variables (e.g. mood, trait anxiety, OCD-relevant beliefs, anxiety sensitivity) (Abramowitz, et al., 2009). Five studies reported the opposite and DT was a significant predictor of OCD symptoms even after other established constructs were accounted for (Briggs & Price, 2009; Cogle, et al., 2011; Cogle, et al., 2012; Keough, et al., 2010; McCubbin & Sampson, 2006). To explain the lack of relationship, Abramowitz, et al. (2009) concluded that the core concept of experiential avoidance which is captured by the measure they used (the AAQ) may be too general a construct to explain additional variance above constructs that have demonstrated relative specificity to OCD. This may suggest a hierarchical model with general avoidance of internal experience as a higher-order factor. DT as measured in the other studies may be a lower order factor, which captures something of the reason internal experiences are avoided and may therefore show a closer relationship with symptoms. Fundamentally this is an empirical question, which is not addressed by these studies, although the findings of Briggs & Price (2009) are at odds with this conclusion. Their study used a predominately community sample and predicted total OCD symptoms, whereas Abramowitz et al (2009) used a student sample and predicted individual OCD subscales. Overall the regression models reported by Abramowitz et al (2009)

had poorer explanatory power compared to Briggs & Price (2009) which may relate to the different measures and analysis strategy used.

Three of the studies from the same research group reported a specific relationship between DT and obsessive symptoms (Cogle, et al., 2011; Cogle, et al., 2012; Macatee, Capron, Schmidt, & Cogle, 2013). Other OCD symptoms did not show a relationship with DT. This series of studies also reported a significant temporal relationship between lower DT at one time point and higher 'thoughts of harm' measured one month later. However, this relationship was not tested reversing the temporal associations (measuring whether 'thoughts of harm' at time one predicted DT at time two), so it is not possible to identify which direction of causality is most strongly supported (causality in the Granger sense, where time series relationships are examined in both directions of temporal precedence to identify which ordering shows the strongest statistical relationship). Cogle, et al. (2012) administered a neutralising task (asking participants to write a difficult sentence involving harm to someone close and then giving them the opportunity to do something to prevent the statement coming true) and found that those who used a neutralisation strategy had significantly lower DT than those who did not. The same group reported that the need to act to prevent harm (negative urgency) was significantly associated with lower DT and that DT moderated the relationship between negative urgency and obsessive symptoms. In a prospective study, Macatee et al (2013) measured DTS at baseline then OCD symptoms and daily stressors twice-weekly for eight weeks. They reported that DTS was only associated with greater obsessions in the context of increased life stressors. Those with low DTS showed an increase in their obsessive symptoms as the number of daily stressors increased, whereas those with high DTS did not show the same relationship. At low levels of daily stressors, the groups were comparable for their level of obsessions.

OCD vs nonclinical control

Two studies compared scores on the DTS of people with OCD against healthy controls. One reported people with OCD scored significantly lower than controls (Hezel, Riemann, & McNally, 2012). This study also included a pain tolerance test which measured the length of time participants could tolerate a painful stimulus (a prolonged increasing pressure on their index finger). Interestingly, participants with OCD reported a comparable level of pain to controls and noticed the pain at a similar point in time, however they endured the painful stimulus an average of 90 seconds longer than the control group. This raises important questions about sensitivity to different types of internal aversive experiences and subjective versus objective measures of stimulus tolerance. The authors hypothesized that patients with OCD who experienced moral obsessions would tolerate more pain as it distracted them from the shame and guilt associated with their unwanted thoughts. This hypothesis was not supported (all patients with OCD, irrespective of the content of their obsessions, tolerated pain for longer). However it raises many questions, such as whether physical pain is more bearable than emotional distress, whether patients did not feel able to ask for the stimulus to be removed (e.g. for fear of seeming weak; indeed there was an association between pain endurance and self-esteem), or whether patients' judgments of their ability to tolerate internal distress is a poor measure of the reality. This highlights one of the key issues with using self-report measures to measure these constructs.

The other study used a regression design rather than between group comparisons to examine the relationship between OCD diagnosis and DTS scores (Macatee, et al., 2013). OCD diagnosis was not a statistically significant predictor of DTS score, however scores on the obsessions subscale (but not the checking, ordering or washing subscales) were significantly associated with DTS scores. When they explored the relationships between OCD subscale scores

and DTS subscales, they reported that only the tolerance and absorption subscales of the DTS were significantly associated with obsessions.

OCD-only studies

One study explored the relationship between threat from emotions (measured using a shortened version of the PTEQ) and OCD symptoms in a clinical sample (Smith, Wetterneck, Hart, Short, & Bjorgvinsson, 2012). They measured patients' scores on the contamination, harm, repugnant thoughts and symmetry subscales of the Dimensional Obsessive Compulsive Scale (Abramowitz, et al., 2010) and related them to perception of threat from anxiety, disgust, guilt and 'not just right feelings'. Scores on the dimensions of harm, repugnant thoughts and symmetry were all correlated significantly with perceived threat from all four emotional states (with the exception of symmetry, which did not correlate significantly with threat from disgust). However, in regression analyses predicting the individual OCD subscale scores from OCD-relevant beliefs and threat from all four emotional states, none of the emotion appraisal variables was a significant predictor in any model (with the exception of perception of threat from 'not just right feelings', which was a significant predictor of symmetry scores). However, the sample size was small in this study and the large number of predictors entered into the regression analysis is likely to have adversely impacted on statistical power.

One study explored the relative contribution of experiential avoidance and OCD-relevant beliefs to OCD symptoms in a clinical sample before and after treatment with ERP plus thought challenging (Manos et al., 2010). The patients in this large study (n=106) had severe OCD symptoms that required inpatient treatment or partial hospitalisation. At baseline there was no relationship between self-reported OCD symptoms and experiential avoidance (as measured by the AAQ) once depressive symptoms were controlled for. However, there were significant

relationships between some of the OCD-relevant belief dimensions and some of the OCD symptom subscale scores, even after variance relating to mood, anxiety and experiential avoidance had been accounted for. After treatment the authors explored the relationship between change in OCD symptoms, change in experiential avoidance and change in OCD-relevant beliefs. There was a significant fall in experiential avoidance following treatment, despite treatment not targeting experiential avoidance specifically. However, the same pattern of relationships was noted – change in experiential avoidance was not significantly related to change in OCD symptom scores on any subscale, but significant relationships were noted between change in OCD-relevant beliefs and OCD symptoms. The authors suggest that experiential avoidance may play little role in the severity of OCD in a severe clinical sample, but acknowledge that treatment specifically targeted OCD-relevant beliefs, not experiential avoidance, which may explain the differential relationships.

Two studies explored the impact of treatment to increase DT in people with OCD (Allen & Barlow, 2009; Twohig, et al., 2006). Both were case series of treatment using Acceptance and Commitment Therapy (ACT) or some of its components. Both studies reported an increase in distress tolerance and a reduction in OCD symptoms. Linking with earlier findings, the intervention was more successful for reducing obsessions than compulsions. Although the samples were very small, these studies nonetheless demonstrate an important principle that increasing acceptance of unwanted internal experiences can alleviate the distress associated with them. It remains to be seen whether larger controlled studies with standardised (rather than idiographic) outcome measures report similar findings.

Overall Summary

The findings indicate that DT does correlate with OCD symptoms and in non-clinical samples it explains additional variance above established constructs such as depression, OCD-relevant beliefs, and AS. However, this was not the case in a clinical sample, where experiential avoidance did not explain additional variance in OCD symptoms above that explained by mood, anxiety and OCD-relevant beliefs. There is building evidence that DT might play more of a role in obsessions – this finding has been replicated in different samples on a number of occasions, although not by independent research groups. A single study reported DT is lower in people with OCD than healthy controls, however their ability to endure physical pain is significantly higher. This brings into question both the validity of self-report methodology and the taxonomy of aversive internal experiences (see also Leyro, et al., 2010). Two case series in patients with OCD identified that reducing experiential avoidance is associated with an improvement in symptoms, especially obsessions.

Discussion

The review aimed to explore the evidence for the role of alexithymia, AS and DT in OCD. There is evidence for each that they are elevated in clinical cases compared to controls, but there was no evidence that any of the three shows specificity for OCD over anxiety disorders. The finding that had the most empirical support was an association between the externally oriented thinking dimension of alexithymia and the OCD syndrome, although some of this association may be criterion confound between symptom scales and the TAS. There were also single studies that identified the following: a relationship between sexual/religious obsessions and alexithymia; a significant relationship between contamination/harming symptoms and fear of cognitive dyscontrol; a significant positive relationship between scores on the uncertainty

subgroup of OCD symptoms and both fear of physical symptoms of anxiety and fear of the social consequences of anxiety; and a significant relationship between obsessions and low distress tolerance. However, these have not been independently replicated.

The most startling feature of this literature is the lack of a unitary methodology, which makes comparisons across studies difficult. The variety of measures, versions, methods for measuring and classifying OCD symptoms and sample-types has resulted in a body of literature that contains almost no direct independent replication. It is worth considering two main reasons for this.

Subtypes of OCD

The OCD spectrum captures a broad array of phenomena that were historically linked because of co-occurrence. However, as research has further-explored the phenotypic variability of OCD – including exploring the functional significance of symptoms – the number of potential ways of identifying subgroups has grown. As this research agenda continues, the result is more methodological variability between studies until a greater consensus is reached. The reviewed studies focusing specifically on OCD tended to use more comprehensive methods of assessing OCD symptoms, often using both diagnostic assessment and symptom scales which were then subdivided into subscales or dimensions. Ensuring inclusion of analyses with total scale scores – whilst often counter to the authors' aims of using this methodology – allows for greater comparability with studies using less comprehensive assessment methods in which OCD may not be the focus and a large number of anxiety symptoms are being assessed within the same individuals. Whilst the refinement of OCD classification continues, this would allow these slightly different literatures to be linked and increases the potential for independent replication.

Clarity of concepts

The concepts considered here emerged largely independently of each other from an exploratory process which began with observed phenomena and has tried to trace back to underlying traits. Unlike constructs derived from a theoretical or empirical start point, as is more commonly seen in cognitive psychology, these evolving constructs can seem to have high clinical relevance but lack a clear definition. These three constructs all posit a fundamental difficulty with emotional experience, but they imply a different underlying deficit and it is unclear to what extent they overlap. Additionally, considering the items of the scales raises a question about what is being measured – questions variously capture beliefs, attitudes, opinions, feelings, and behaviours. Clarifying what is being measured has significant implications both for ongoing research and how to help an individual change. For example are we exploring a deficit in someone's ability more akin to a developmental disorder that has to be managed or compensated for, the outcome of a learning process than can be changed with alternative experience or knowledge, or a current but perhaps temporary state of heightened sensitivity that can be down-regulated or recalibrated?

The gradual evolution of these constructs with continued empirical application has undoubtedly refined them, but has also resulted in multiple measures and versions, which has reduced the comparability of studies across time. Additionally, little is known about the interrelationships between these constructs. Measuring them at the same time in the same individuals and using relevant analysis to identify whether the scale boundaries are meaningful would be informative in this regard.

There is also a need for a theoretical basis to underpin further development of these constructs. This presents a significant challenge, as the area potentially spans the full range of

knowledge about human emotional function from the biologically-rooted physiological changes associated with the basic emotions, to the socially constructed and socially learned display rules surrounding emotional expression, to the idiographic development of personal meaning of, or derived from, internal experience. There are likely to be different reasons why individuals are sensitive or averse to internal sensations and a comprehensive model should incorporate at least altered sensitivity, intensity, appraisal (of the experience, its consequences, and the ability to cope), and beliefs about the importance of hiding or expressing emotions. Difficulties in any one of these areas may be problematic, but they suggest different management or treatment strategies. The lack of a common nomenclature or taxonomy for internal states and experiences is no small barrier to this endeavour and there is much still to be learned about how people make sense of their internal worlds. One study indicated a seemingly paradoxical finding that people with OCD reported significantly lower self-reported distress tolerance than controls, but endured a painful stimulus significantly longer (Hezel, et al., 2012). This potentially brings into question the validity of self-report methodology in this area, which is confounded by insight and impression management. A recent study attempted to go beyond self-report methodology and used behavioural measures of distress tolerance, including persistence on frustrating or physically effortful tasks (Cogle, Timpano, Sarawgi, Smith, & Fitch, 2013). Although reported in a non-clinical sample, a relationship was identified between obsessions and poor persistence on a frustrating task. These methodologies offer promise for a broader exploration of constructs related to internal state tolerance beyond self-report questionnaires.

Limitations

There are several limitations of this review necessary to mention. There are potentially relevant areas that have not been considered (e.g. studies of emotion recognition and implicit

emotional processing would have added information about the functioning of ‘the emotional decoding system’ in people with OCD). Additionally, although attempts to be as comprehensive as possible were made, the diverse terminology used across several fields risks exclusions and some relevant studies may not have been identified. Some of the exclusion criteria may have omitted studies which did replicate existing findings (e.g. non-English language papers and dissertations). Studies focussing specifically on hoarding disorder were excluded from the present review, although several have explored the relationship between anxiety sensitivity and/or distress tolerance in this population (Coles, Frost, Heimberg, & Steketee, 2003; Fernandez de la Cruz et al., 2013; Timpano, et al., 2009; Timpano, Keough, Traeger, & Schmidt, 2011; Wheaton, Abramowitz, Franklin, Berman, & Fabricant, 2011). Although current classifications support a distinction between OCD and hoarding disorder, the extent to which it is believed that similar processes are involved in these disorders will dictate whether these findings are also deemed relevant to understanding some elements of OCD.

Conclusion

The main aim of the review was to examine whether the present evidence enables conclusions to be drawn about the implications for our understanding and treatment of OCD. Mostly it has highlighted the complexities of the literature in this area, but it has also indicated that there is evidence that some people with OCD have greater difficulties understanding and tolerating their internal states. Some of the symptoms of their OCD may be an attempt to manage this difficulty, but it is unclear how these internal states arise. By a cognitive account, thoughts and thinking biases generate emotions (Lazarus, 1984), in which case difficulties identifying, expressing and tolerating emotional states will intensify the problem creating a ‘turbo-charger’ effect (Johnson-Laird, Mancini, & Gangemi, 2006). An alternative account suggests affect

precedes cognition (Zajonc, 1984), and for OCD the extreme endpoint of this interpretation is that obsessional symptoms are a post-hoc account for the distressing internal experience, which is primary (Beech, 1971). Furthermore, distorted cognitions and difficulties understanding and tolerating internal states may exist in tandem and create a mutually-reinforcing vicious circle. These accounts are not mutually exclusive and the relationships may differ between individuals. However, they do suggest a different emphasis for therapeutic endeavours aimed at improving the understanding and tolerance of internal states to alleviate someone's difficulties.

Understanding mechanisms by which internal experience, symptoms and cognitions *can* relate to and influence one another is a key area for further research.

Preliminary evidence suggests improvement in the ability to tolerate difficult internal experiences is associated with a reduction in symptoms, but it is not clear how. The success of ERP in treating OCD could be conceptualised as improving emotion tolerance via habituation, in which case these different approaches may work through a common mechanism. However, much remains to be understood. In order to develop our understanding of the implications for models of OCD, future research needs to focus on replication of existing findings, improving the comparability of studies, and developing an understanding of the relevant constructs in relation to models of human emotional functioning. To identify whether there are differences between OCD and anxiety disorders in the relationship between intolerance of internal experiences and symptoms, studies with large well-characterised clinical groups that measure both symptoms and alexithymia, AS and DT would be especially informative. Exploring the relationships both between and within the groups could help to identify the way in which these constructs contribute to symptoms in different clinical presentations. Additionally, comparing the pattern of scores on the subscales of the emotion measures more thoroughly could identify whether similar

or different profiles are noted across different disorders. As has been used to explore Intolerance of Uncertainty across anxiety disorder samples, in a sufficiently large sample techniques such as Kernel density estimation or multi-group factor analysis can be used to compare the distributions of scores and response patterns between different clinical groups (Carleton et al., 2012). Where considered, the present studies have tended to set a staunch test for these emotion measures by using hierarchical regression and entering these variables only after variance related to established constructs has already been explained. Although it is important to establish the additional contribution for relatively newer constructs if the aim is to improve on existing models, but this methodology nonetheless presupposes that the potential importance of constructs (in terms of explanatory power) will match the historical order in which they are identified. Exploring alternative regression models or using structural equation modelling could help elucidate whether there is an underlying structure to how these constructs relate to one another and result in observed symptoms. Exploring this within OCD samples and within samples of patients with an anxiety disorder could reveal whether this structure is similar or different between clinical groups. Studies in analogue groups could progress to select high and low scorers on these measures and compare OCD symptoms or use an experimental manipulation (such as a mood manipulation or a stress-induction paradigm) to identify the strategies used to manage changes in internal state. Ultimately the greatest test is to use a prospective controlled experimental design to identify whether altering an individual's understanding, expression, acceptance and tolerance of their internal experiences reduces their OCD symptoms. Then its potential treatment utility would become much clearer.

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Table 1

Summary of studies investigating the relationship between alexithymia and OCD

Author	Sample						Measure	Summary
	OCD			Non-OCD				
	n	Age ^a	Gender ^b	n	Age ^a	Gender ^b		
OCD vs Control								
Grabe et al 2006	82	37.4 (12.3)	63.4	169 OCD	47.8 (17.2)	59.2	TAS-20 German	Higher incidence of alexithymia in OCD patients (11%) than FDRs (1.8%), controls (2.6%) and control FDRs (1.4%). OCD sig higher than at least one other group on factors 1 & 2. No evidence of familiarity of alexithymia in the OCD sample.
				76 Con	41.1 (16.8)	63.2		
				144 Con FDR	45.7 (16.8)	62.5		
Besharat 2008	49	NR	NR	173 Con	34.3 (9.1)	NR	TAS-20 Persian	OCD patients scored significantly higher than controls on all 3 subscales
				53 MD	NR	NR		
				67 Anx	NR	NR		
Carpenter & Cheung 2011	62	28.2 (9.1)	75.6	79	33.9 (12.2)	86	TAS-20	Higher alexithymia on all dimensions in people with OCD recruited from self-help websites compared to controls.
Roh et al 2011	45	33.3 (13.6)	37.8	45	29.6 (9.7)	46.7	TAS-20 Korean	Patients scored more highly than controls on all subscales. 31% of patients scored above alexithymia cut-off. Alexithymia was only predicted by sexual/religious obsessions.
OCD vs Control								
Kang et al 2012	107	27.5 (9.2)	35	130	26 (4.8)	46.6	TAS-20	A greater proportion of patients (41%) scored above cut-off for alexithymia than controls (4%). Results indicated OCD patients perceive emotions normally but have difficulties with emotional self-control in response to others' emotions and with the cognitive understanding of social context.
OCD vs other clinical								

Zeitlin & McNally 1993	31	32.9 (11.8)	35	27 PD	34.4 (8.6)	78	TAS-26	PD patients scored significantly higher on the total TAS than OCD patients. 67% of PD patients scored in the alexithymic range compared to 13% of OCD patients.
Bankier et al 2001	59*	32 (9)	42	24 SF 123 PD 28 MD	38 (8.6) 36 (11.3) 38 (11)	88 61 64	TAS-20 German	PD patients scored significantly lower than the other three groups. Scores on factor 3 were significantly associated with an OCD diagnosis.
OCD only								
Rufer et al 2004	42*			-	-	-	TAS-20 German	Measured TAS pre- and post-CBT treatment. Significant drop in factor 2 scores with treatment. No difference in response to treatment for those scoring above versus below alexithymia cut-off .
De Berardis et al 2005	112	35.7 (12.8)	54	-	-	-	TAS-20 Italian	Compared TAS scores in those with good and poor symptom-insight. Poor insight scored significantly higher on all factors.
Rufer et al 2006	34*	32.5 (9)	62	-	-	-	TAS-20 German	Additional follow-up interval to Rufer et al (2004). Significant drop in factor 1 and 2 scores over time, but magnitude smaller than that seen in symptoms. TAS scores did not predict outcome from post-treatment to follow-up.

Notes: NR, not reported; PD, panic disorder; SF, somatoform disorder; MD, major depression; TAS, Toronto Alexithymia Scale; FDR, First degree relative; OCD, Obsessive Compulsive Disorder; Anx, mixed anxiety disorder; SF, somatoform disorder; PD, panic disorder; MD, major depression; Con, healthy control

* inpatients; ^aNumbers represent mean (standard deviation); ^b % female

Table 2

Reported mean scores (standard deviation in brackets) on the Toronto Alexithymia Scale

Study	Scale version	Sample	Total	F1	F2	F3	Comparison on sample	Total	F1	F2	F3
Grabe et al 2006	TAS-20 German	OCD	46.68 (11.1)	14.95 (5.5)	12.3 (4.1)	19.22 (4.3)	Healthy control	41.07 (9.8)	11.83 (4.5)	10.93 (3.2)	19.39 (4.1)
Besharat 2008	TAS-20 Persian	OCD	52.53 (15.34)	20.44 (6.32)	13.28 (3.39)	18.79 (5.75)	Healthy control	43.88 (15.06)	16.54 (6.55)	11.44 (3.36)	15.88 (5.27)
Carpenter & Cheung 2011	TAS-20	OCD	-	21.5 (6.1)	14.7 (5.1)	18.5 (5.4)	Healthy control	-	14.8 (6.2)	10.6 (3.9)	15.6 (4.3)
Roh et al 2011	TAS-20 Korean	OCD	53.8 (11.6)	17.6 (7.1)	14.9 (4.5)	21.3 (3.2)	Healthy control	44.9 (8.8)	13.6 (4.6)	12.1 (3.5)	19.2 (3.4)
Kang et al 2012	TAS-20	OCD	41.1% 'Alexithymic' 23.3% 'Possibly alexithymic' 33.7% 'Not alexithymic'				Healthy control	4% 'Alexithymic' 16.7% 'Possibly alexithymic' 79.4% 'Not alexithymic'			
Zeitlin & McNally 1993	TAS-26	OCD	61.16 (9.82)	-	-	-	Panic disorder	76.48 (12.36)	-	-	-
Bankier et al 2001	TAS-20 German	OCD	51.9 (8.7)	-	-	-	Panic	49.0 (11.4)	-	-	-
							Somatiform	54.9 (12.4)	-	-	-
							Major Depression	56.6 (13.6)	-	-	-
Rufner et al 2004	TAS-20 German	OCD pre-treatment	49.6 (11.3)	17.1 (6.0)	14.4 (3.9)	18.1 (4.9)					
		OCD post-treatment	47.3 (13.3)	16.2 (6.2)	13.2 (4.7)	17.9 (4.6)					
De Beradis et al 2005	TAS-20 Italian	OCD all	53.3 (14.6)	12.6 (5.8)	12.4 (3.8)	30.5 (6.7)					
		OCD good	48.1 (11.7)	12.1 (5.1)	11.8 (3.3)	24.2 (5.3)					

		insight				
		OCD				
		poor insight	65.6 (13.5)	16.2 (6.3)	15.4 (3.9)	33.9 (6.7)
Rufer et al 2006	TAS-20	Time 1	51.6 (10.9)	18.0 (5.9)	15.1 (3.6)	18.4 (4.9)
	German	Time 2	48.9 (13.9)	17.0 (6.4)	13.6 (4.8)	8.3 (4.8)
	n	Time 3	45.5 (12.8)	15.1 (5.8)	12.3 (4.2)	18.1 (5.3)

F1, Factor 1 (Difficulty identifying feelings); F2, Factor 2 (Difficulty expressing feelings); F3, Factor 3 (Externally Oriented Thinking)

Table 3

Summary of studies exploring the relationship between anxiety sensitivity and OCD

Author	Sample						Measure	Summary
	OCD			Non-OCD				
	n	Age ^a	Gender ^b	n	Age ^a	Gender ^b		
Non-Clinical Studies								
Sexton et al 2003	-	-	-	91	20.28 (4.56)	65	ASI-R	Significant association between anxiety sensitivity and OCD symptoms and ASI
David et al 2009	-	-	-	270 300	19 19	52 56	ASI-3 ASI-3	ASI significantly predicted hoarding, checking & washing
Keough et al 2010	-	-	-	418	18.8 (2.39)	71	ASI-16	Significant relationship between anxiety sensitivity and all OCD symptom subscales
Wheaton et al 2012	-	-	-	636	19.9 (2.24)	66.7	ASI-3	Different OCD symptoms were predicted by different anxiety sensitivity subscales
OCD and non-clinical controls								
Zinbarg et al 1997	25	NR	NR	407 mixed 32 Con	NR NR	NR NR	ASI-16	OCD significantly higher than controls on all three subscales. OCD significantly higher than social phobia on all three subscales
Deacon & Abramowitz 2006	92	-	-	140 mixed 453 Stu	36.3 (12.7) 19.2 (1.9)	56.5 52.1	ASI-R	OCD significantly higher than controls on all subscales. OCD significantly higher than social phobia on all subscales. OCD significantly higher than controls on physical subscales
Wheaton et al 2012	198	-	-	308 mixed 315 Stu	32.9 (13.8) 20.22 (1.75)	52.7 73.7	ASI-3	OCD higher than controls on all subscales. Relatively similar relationship between ASI and OCD symptoms. Anxiety sensitivity significantly lower than controls on all subscales. Significantly lower anxiety sensitivity score. Significantly lower anxiety sensitivity score on hypochondriasis on ASI-3
OCD and other clinical groups								
Taylor et al 1992	67	-	-	243 mixed	35.1 (1.03)*	67	ASI-16	AS elevated in all anxiety disorders. Anxiety sensitivity specific phobia (compulsive disorder) group significantly higher than controls groups except PTSD.
Zeitlin & McNally 1993	31	32.9 (11.8)	35	27 PD	34.4 (8.6)	78	ASI-16	PD patients significantly higher than controls on total ASI
Norton et al 2005	79	-	-	116 mixed	40.46 (11.82)	66.4	ASI-16	Significant association between anxiety sensitivity and OCD symptoms and ASI
McWilliams et al 2007	24	NR	100	847 mixed 996 Con	NR NR	100% NR	ASI-16	Significant relationship between anxiety sensitivity physical subscale and OCD status; no longer significant when controlling for neuroticism was controlled

Deacon & Abramowitz 2008	21	-	-	50 PD 23 Hypo C	37.4 (13.7)	63.8	ASI-R	OCD group significant on Respiratory scale; lower than HypoC on
OCD-only studies								
Calamari et al 2004	220	NR	49	-	-	-	ASI	Used 7 subgroups of C Omnibus difference in differences on post-ho Hoarding group score contamination/ harmi
Calamari et al 2008	240	34.9 (11.7)	62	-	-	-	ASI-16 & ASI-R	ASI moderately corre symptoms. ASI expla variance in OCD sym depression and OCD- Complex pattern of co ASI subscales and OC

Notes: NR, not reported; OCD, Obsessive Compulsive Disorder; mixed, mixed patient

group; PD, panic disorder; HypoC, hypochondriasis; Con, healthy control; ASI, Anxiety

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* Whole sample; ^aNumbers represent mean (standard deviation); ^b % female

Table 4

Summary of studies investigating the relationship between distress tolerance and OCD

Author	Sample						Measure	Summary
	OCD			Non-OCD				
	n	Age ^a	Gender ^b	n	Age ^a	Gender ^b		
Non-clinical studies								
McCubbin et al 2006	-	-	-	189	23 (NR)	71.4	PTEQ	Threat from emotions (esp anger) relates to OCD symptoms
Abramowitz et al 2009	-	-	-	353	19.3 (2.8)	70	AAQ-II	Experiential avoidance did not explain additional variance in OCD symptoms once more-established constructs had been accounted for (OCD-relevant beliefs)
Briggs & Price 2009	-	-	-	313	27.7 (11.7)	75.4	AAQ	Significant association between experiential avoidance and OCD symptoms and beliefs
Keough et al 2010	-	-	-	418	18.8 (2.4)	71	DTS	DT significantly related to all anxiety disorder symptoms measured (weakest relationship was with OCD symptoms). Explained additional variance after AS was accounted for.
Cogle et al 2011	-	-	-	277	19.1 (1.5)	63.5	DTS	Suggests DT has a specific relationship with obsessive symptoms. DT predicts additional variance in symptoms above other established constructs; some evidence of a temporal association between DT and later obsessions, and a link between DT and use of maladaptive coping strategies (neutralisation).
				218	19.0 (1.6)	78.4	DTS	
				63	18.7 (1.1)	82.5	DTS	
Cogle et al 2012	-	-	-	238	19.5 (5.4)	77.7	DTS	DT moderates the relationship between obsessions and the need to act (negative urgency)
Macatee et al	-	-	-	102	19.5	72.5	DTS	In the context of greater

2013					(2.7)			life stressors, low DT is associated with greater obsessive symptoms
OCD vs control								
Hezel et al 2012	20	-	-	25	30.6 (10.0)	44	DTS	OCD significantly lower on DTS than controls. OCD had significantly longer pain endurance than controls.
Macatee et al 2013	22	28.0 (NR)	70	37	42.5 (NR)	40.5	DTS	Significant association between DTS and obsessions subscale scores, but not other OCD subscales. Obsessions were significantly related to the tolerance and absorption subscales of the DTS.
OCD-only studies								
Twohig et al 2006	4	-	-	-	-	-	AAQ	Case series using ACT for OCD. All patients showed higher DT by the end of treatment and all had made improvements in symptoms.
Allen & Barlow 2009	7	-	-	-	-	-	-	Case series teaching emotion acceptance-based skills to people with OCD. Learning the skills was associated with a drop in individual-specific target symptoms. More effective for obsessions than compulsions.
Manos et al 2010	108	32.1 (12.4)	54.6	-	-	-	AAQ	
Smith et al (2012)	44	31.9 (10.1)	NR	-	-	-	PTEQ-R	Threat from anxiety, disgust & guilt correlated significantly with OCD symptom dimensions of harm, unacceptable thoughts and symmetry (but not with contamination). These relationships were not significant in regression when other

factors were controlled
for.

Notes: NR, not reported; OCD, Obsessive Compulsive Disorder; PTEQ(-R), Perceptions of Threat from Emotions Questionnaire (Revised); AAQ, Acceptance and Action Questionnaire; DTS, Distress Tolerance Scale; ACT, Acceptance and Commitment Therapy; DT, Distress Tolerance; AS, Anxiety Sensitivity

^aNumbers represent mean (standard deviation); ^b % female

Highlights

Comprehensive review of understanding, sensitivity to and tolerance of emotion in OCD

Evidence that all three relate to OCD symptoms, but limited studies in patient groups

No evidence of specificity for OCD over other anxiety disorders

Lack of clarity around construct definition and subtypes of OCD clouds findings